

said shrinking method comprising the steps of:
disposing a second device in the vicinity of said heat-shrinkable device,
said second device capable of irradiating electromagnetic radiation;
and
irradiating the heat-shrinkable device with the second device effective to
generate heat in said thin film and shrink the heat-shrinkable device..

REMARKS

Entry of the foregoing amendments, and reexamination and reconsideration of the subject application, pursuant to and consistent with 37 C.F.R. § 1.104 and § 1.112, and in light of the following remarks, are respectfully requested.

Amendments; Claim Objections

Claims 1-3, 5, 11, and 12 have been amended to more clearly recite the composition of the claimed device, and to overcome the objections to the claims.

Claim 15 has been cancelled.

New claims 16 and 17 are generic. As discussed below, a tube and a sheet of the same material are not believed to be patentably distinct species.

The specification is amended in connection with the request for drawing correction mentioned below.

Drawings and Objection Thereto

New drawing sheets are provided showing Figs. 6A, 6B, and 10 labeled as prior art.

A request for correction of Fig. 1 is submitted to include references to the tubular member (1a) and the thin film (1b) thereon.

New Matter Rejection under 35 U.S.C. 132

Claim 15 has been cancelled, so this rejection is now moot, although it would have been traversed in connection with the Election requirement discussed next.

Election of Species Requirement

In spite of the Office's protocol and the response by the prior attorney, the undersigned, to which this case has been transferred, respectfully traverses the election requirement as untenable because Figs. 1 and 2 are no more different species than a sheet of paper (e.g., Fig. 2) is a different species than a sheet of paper rolled up into a tube (e.g., Fig. 1). There is no combination/subcombination relationship (MPEP 808.02, referring to 806.05(c)), nor is there any process/product/apparatus relationship between a sheet and a tube made from the sheet.

The disclosure at pages eight to nine of this application clearly explains that the sheet of Fig. 2 is provided with ribs (4); the sheet is rolled into a cylinder (page 8, ln. 24-25) and the ribs are held together, after which the cylinder formed from the rolled-up sheet is shrunk, as seen in Fig. 1. Note also page 9 (first full paragraph). Accordingly, the basis for the new matter rejection is incorrect.

More importantly, the "sheet" of the non-elected "species" is not exclusive of the elected species. That is, the claims to the "sheet" are generic to the claims to the "tube", which is a particular 3D geometry of a sheet.

Generic claims 16 and 17 have been added which are independent of the geometry of the article and hence read on both the elected and non-elected species. The Election requirement should now be withdrawn.

Rejection under 35 U.S.C. 112, First Paragraph

The rejection of claims 1-5 (and 15) hereunder for allegedly failing to adequately describe what is meant by 'insulator' is respectfully traversed.

The specification must be read as one of ordinary skill would read the specification. On the first page (third paragraph), the Background section clearly states that to "assur[e] electric insulation of the exposed part from surroundings, use is sometimes made of a heat-shrinkable tube."

As described at least at page seven of the specification, and as known in the art, these devices shrink because they are heated; in this invention, the heating is induced in the thin film adhered to the tube. It is also well known that the heat generated need only be sufficient to heat the shrinkable (cross-linkable)

substrate, so large quantities of heat are clearly not needed (else the integrity of the plastic tube/sheet would be destroyed). So there is no need for a thermal insulator.

Finally, it is clear from the specification (e.g., page 8, fourth full paragraph) that the second phase can include a material such as alumina (Al_2O_3) and that the thin film itself has a high magnetic loss characteristic with respect to μ ". It is this magnetic loss characteristic (μ ") that contributes to the heating of the thin film, hence the heating and shrinking of the tube substrate. Thus, it would be apparent to one of ordinary skill in the art that, to an extent sufficient to heat and shrink the tube, the thin film acts as a magnetic insulator converting electromagnetic radiation into heat. The description further makes clear that the well-known electrical and magnetic conductivity of Fe, Co, and Ni recited in the claims is essentially the opposite of a phase such as alumina, which is commonly used as an electrical insulator and thermal insulator. The various Tables in the application show that the second phase target can be alumina, aluminum, boron nitride, or other materials. The rejection fails to provide even a *prima facie* case that Applicants were not in possession of their invention at the time of filing, and so this rejection should now be withdrawn.

The statement that there is no support for producing the tube as shown in Fig. 1 is clearly wrong, and support in the specification for providing that structure has been given above. The fact that the specification teaches rolling up a sheet as shown in Fig. 2, clipping it in place, and remotely heating the tube (with, for example, an oscillator) shows the fallacy for alleging that the shrunk tube of Fig. 1 and the sheet of Fig. 2 are different species. It is as if tape on a roll were a species independent and distinct from a piece of that tape adhered to a substrate.

Rejection under 35 U.S.C. 112, Second Paragraph

The rejection of claims 1-5 and 15 hereunder is believed obviated by the present amendments and remarks.

Rejections under 35 U.S.C. 102 and 103

The rejections of claims 1-4 over McGaffigan ('799 and '521) hereunder are respectfully traversed.

The '799 reference shows particles dispersed in a binder (e.g., col. 9, ln. 55-57). The reference does not show a "thin film" as recited in the claims. A 'thin film' is a term of art referring to a material that is, or approximates, a monomolecular thickness, and is formed by vacuum deposition or sputtering, as shown by the examples in the present specification. A thin film is structurally different than a powder dispersed in a binder. Accordingly, these claims do not read on the reference structure and so are not anticipated.

The '521 reference shows the same as the '799 reference with the addition of non-heat producing, non-magnetic loss particles (col. 15, ln. 55-59) to the adhesive mixture of binder and particles (col. 17, first paragraph). Again, the reference fails to show a "thin film" structure.

These references only disclose mixing particles with a binder and forming the binder mixture into a film on a heat-shrinkable substrate. From that teaching, there is no suggestion that a thin film, which inherently lacks a binder, can be formed on a heat-shrinkable material to produce the claimed device.

The combination of the '799 or '521 reference with Hiramoto is unwarranted and amounts to hindsight reconstruction. Hiramoto specifically teaches away from the present invention: (i) at column one (ln. 43-50) by teaching that the undesirable conventional material is a two-phase separated material, yet a two phase material is what is described and claimed in this application; (ii) that sputtering is an undesirable technique (col. 1, ln. 51-62) even though used in the examples of the present application; and (iii) that it is "substantially difficult to effect complete two-phase separation" using sputtering (*id.*). Moreover, Hiramoto is concerned with magnetostriction because he is making a magnetic recording head or a magnetic sensor, and thus does not want high magnetic loss, as desired by this invention and the references. (Note also col. 1, ln. 16-21.) Accordingly, Hiramoto teaches away from both this invention and from the cited references.

Even if the composition of the '799 or '521 reference were modified to include the compositions of Hiramoto, which is undesirable given the properties of the composition and the effect desired by McGaffigan, such a substitution still does not teach or suggest a high loss thin film on the surface of a heat-shrinkable device. Accordingly, all of the prior art rejections should be withdrawn.

Conclusion

In light of the amendments and remarks herein, further and favorable action, including withdrawal of the election requirement, the objections, and the rejections, and issuance of a Notice of Allowance, are now believed to be in order, and such actions are earnestly solicited.

Respectfully submitted,



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APPENDIX SHOWING MARKUPS OF AMENDMENTS

IN THE SPECIFICATION

Page 7, first paragraph:

Next, a material comprising a mixture of low-density polyethylene and dicumyl peroxide was prepared and formed into a tubular member 1a having a thickness of 1mm and an outer diameter of 10mm. Through a cross-linking reaction and an expanding step, an expanded tubular member having a thickness of 0.85mm and an outer diameter of 30mm was obtained. The above-mentioned thin film was transferred and adhered, as depicted by reference numeral 1b, to an outer one of cylindrical surfaces of the tubular member 1a to obtain the heat-shrinkable tube 1.

IN THE CLAIMS

1. (Amended.) A heat-shrinkable tube comprising:
a tubular member being shrinkable in response to heat and having a cylindrical surface; and
a thin film formed on at least a part of said cylindrical surface and being made of a magnetic loss material which has a high magnetic loss characteristic, said thin film having:
a first phase comprising [a first one of] a first element selected from the group consisting of Fe, Co, and Ni; and
a second phase comprising an [insulator containing at least one] element other than Fe, Co, and Ni.
2. (Amended.) The heat-shrinkable tube according to claim 1, wherein said first phase further [comprising] comprises, as a second element, another one of Fe, Co, and Ni, said second [one] element being mixed [to] with said first [one] element.
3. (Amended.) The heat-shrinkable tube according to claim 2, wherein said first phase further [comprising] comprises, as a third element, a remaining

one of Fe, Co, and Ni, said third [one] element being mixed [to] with said first and said second [ones] elements.

5. (Amended.) The heat-shrinkable tube according to claim 1, wherein said thin film is made of a magnetic substance [of] being a magnetic composition comprising M, X and Y, wherein M is a metallic magnetic material consisting of Fe, Co, and/or Ni, X being element or elements other than M and Y, and Y being F, N, and/or O, in the composition [so] such that said M-X-Y magnetic composition has a saturation magnetization of [35-80%] 35% to 80% of that of the metallic bulk of the magnetic material comprising M alone, said magnetic composition having [the] a maximum value μ''_{\max} of an imaginary part μ'' of relative permeability in a frequency range of [0.1-10 gigahertz (GHz)] 0.1GHz to 10GHz.

11. (Amended.) A method of shrinking [the] a heat-shrinkable tube [as claimed in claim 1] comprising:

providing a tubular member being shrinkable in response to heat and having a cylindrical surface,

a thin film formed on at least a part of said cylindrical surface and being made of a magnetic loss material which as a high magnetic loss characteristic, said thin film having

a first phase comprising at least one of Fe, Co, and Ni, and a second phase comprising at least one element other than Fe, Co, and Ni;

said shrinking method comprising the steps of:
disposing an oscillator in the vicinity of said thin film; and
making said oscillator irradiate electromagnetic radiation towards said thin film, so that said thin film generates said heat.

12. (Amended.) A method of shrinking a heat-shrinkable tube [as claimed in claim 1] comprising:

providing a tubular member being shrinkable in response to heat and having a cylindrical surface,

a thin film formed on at least a part of said cylindrical surface and being made of a magnetic loss material which as a high magnetic loss characteristic, said thin film having

a first phase comprising at least one of Fe, Co, and Ni, and a second phase comprising at least one element other than Fe, Co, and Ni;

said shrinking method comprising the steps of:

disposing a conductive wire in the vicinity of said thin film; and

supplying an alternating current to said conductive wire to make said conductive wire irradiate electromagnetic radiation towards said thin film, so that said thin film generates heat.